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ABSTRACT

As a part of the U. S. Naval Academy Self-Paced Physics Course materials, orientation is presented in this manual to assist an instructor in developing his individual class policies. Descriptions are given of objectives, class atmosphere, student progress, counseling activities, and remedial work. Under the heading of the management sequence, special concern is given to the characteristics of problems and solutions segments and to the study guide, a latent-image type on which sequencing information is revealed by using a special crayon. Moreover, the features of the student manual, homework assignments, audiovisual materials, prime and supplementary textbooks, progress checks, and quarterly diagnostic tests are analyzed to provide a detailed guide for the proper use of these materials. Included is a flow-chart which reflects a general overview of the operational functions of the course. (Related documents are SE 016 065 - SE 016 088 and ED 062 123 - ED 062 125.) (CC)

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INSTRUCTOR MANUAL

UNITED STATES NAVAL ACADEMY

Self-Paced

PHYSICS

SE 016 066

PREFACE

This manual was prepared as a reference and guide for Instructors of the Naval Academy Self-Paced Physics Course. Additional orientation is provided by the Course Manager.

Contained herein are:

1. Notes to the Instructor,
2. A description of the Management Sequence, and
3. A flow-chart which reflects a general overview of the operational functions of the course.

It is suggested that the Instructor familiarize himself with the course materials and the following student "hand-outs"-

Course Policy

The Student Manual

The Self-Paced Laboratory

NOTES TO THE INSTRUCTOR OF SELF-PACED PHYSICS

1. Introduction

The methods and operation of the self-paced physics course may seem strange to new instructors as well as to the students. This information is presented to assist the instructor in developing his individual class policies. It is presumed you are familiar with the Student Manual and Course Policy Statement.

2. Objective

The objective of the course is to enable each midshipman to complete the tasks defined by the Terminal Objectives (TOs). If you have not done so previously, you should read the TOs, as they constitute the most accurate definition of course content. Because of the way the Problem/Solution books have been constructed, successful completion of all the core questions should cover all the TOs. Since the core questions were also designed to provide a path for fast students, they are frequently complex problems that combine elements of several TOs. Due to the limited time available for testing, the body of TOs is sampled randomly during Progress Checks and Diagnostic Tests.

3. Class Atmosphere

There are few constraints on how you use class time to move the students through the material. If your class size permits, you are encouraged to use Room 203 as your regular classroom. Initially, a certain amount of encouragement may be needed to steer the midshipmen to the various media. You should try as many of the media as time permits yourself so you can recommend a particular Audiovisual if a midshipman is having trouble in a specific area. You may wish to add additional demonstrations or conduct small topical lectures occasionally. Comprehensive reviews prior to Diagnostic Tests are frequently given.

3. Student Progress

One of the by products of the course organization is the early identification of potential failures, before they reach the Diagnostic Checks. This early identification can be done most effectively by careful screening of study guide responses and progress check responses. The individual prescription for assistance is in your hands, but the early identification of these individuals and the variety of materials available should provide you with considerable flexibility.

5. Areas of Concern

a. Minimum Lecture. You, as well as some of your midshipmen, may feel uncomfortable, initially, because you are not conducting lectures during most of the class time. Experience has shown that most students adapt readily to the self-paced class routine within four to six weeks. You may choose to lecture frequently; however, you will probably have little time left to grade progress checks or counsel slow students, except in EI (Extra-Instruction) Sessions. Another by-product of the course organization is to move a substantial amount of student counseling and remedial work into the classroom.

b. Student Progress. Because of the great amount of material covered by the course, you will soon find students dropping well behind the average (or, from your view, a desirable) class progress. Your success in keeping the class moving will be limited only by your imagination. One reason for the apparently slow class progress may be confusion between a very weak physics student and a good student who chooses to "pace" himself to the speed of slower classmates. Careful screening of study guide and progress check responses can usually separate the two.

The Management Sequence

1. Each student is issued one prime textbook; at least two other supplementary texts are at all times available in physics or in the library.

2. Each student is issued a Student Manual intended to supply the student with all the procedural information required.

3. Course work begins with the issuance of Segment 1 of Problems and Solutions and the Study Guide for the same Segment. The Study Guide is a latent image type on which sequencing information is revealed by means of a special crayon.

4. The Study Guide features are:

(a) A reading assignment indicating prime reading and supplementary reading, both clearly identified.

(b) Core problems identified by score lines over and under the problem number.

(c) Remedial loop problems ("enabling problems"). The instructions for short-circuiting the loops, or following them, are contained in the Study Guide for each individual set.

(d) Titles and directions for Information Panels contained in the Problems and Solutions.

(e) Titles and directions for Audiovisuals. These are available in three formats:

(1) Video tapes;

(2) Talking Books;

(3) Illustrated Texts

(f) Homework assignment, generally in the form of additional problems in the prime text.

5. The Problems and Solutions features are:

(a) Section 1: Problems and diagrams in numerical sequence.

(b) Core problems identified by enclosing each one in a box.

(c) Information Panels preceding core groups.

(d) Scrambled problem solutions: directions for reaching solution is revealed only in the Study Guide when correct answer is chosen.

(e) Each solution for core and core-primed questions is followed by a true-false question whose answer is derivable from the solution to which it pertains. These TF's are answered in special boxed sections of the Study Guide. NOTE: Each core problem which is answered incorrectly requires that the student follow the remedial or enabling loop which

always concludes with another problem having the same conceptual basis as the core problem initially missed. Such problems are called "core-primed."

(f) The scrambling process used for the solutions is extremely difficult to compromise. The time required to short-circuit the response pattern is expected to be too great to make it worthwhile.

6. The Progress Check. This is a form of test which follows a unit of work, usually three successive Segments. The Progress Check is graded by the teacher. The performance of the student is evaluated and he is then guided into one of the channels indicated below. To be eligible for the Progress Check, the student must submit to his instructor all of the relevant revealed Study Guides for that unit.

(a) Using a predetermined cut-off grade, the student is given the "go" signal if his performance is above this level. He is also given a set of remedial suggestions in the form of reading, programmed material, films, etc.

(b) If his performance falls below the cut-off, he is given a "stop" signal with remedials, after which he re-takes a Progress Check. Questions on these checks will be randomized so that no two students ever take exactly the same examination, nor does the same student take the

same check on the second round.

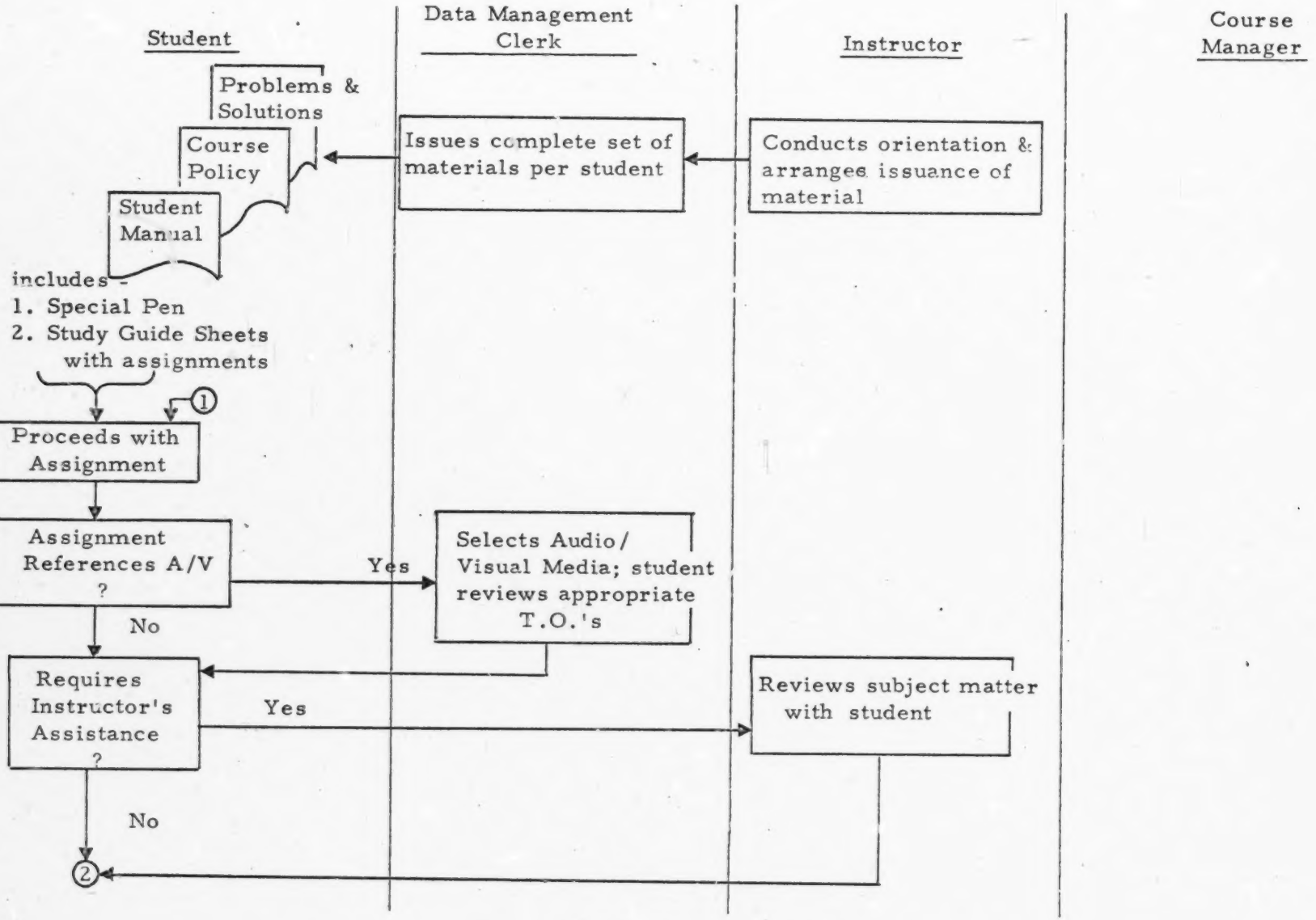
(c) If his performance falls below cut-off on the retake, he will be given individual tutorial assistance and required to take a third test. Disposition of the student after the third failure will be left to the chairman of the physics committee at the Academy.

7. Quarterly Diagnostic Tests. These tests will be carefully generated to test for recognition and recall, understanding of concept, ability to recognize concepts which appear in problems, and ability to solve problems. These tests will all be of the multiple choice variety, with a response mechanism suitable for computer grading. One of the quarterly diagnostics will replace the mid-term examination and the last of them will be administered about one week before the standard final examination.

8. At the end of each quarter the instructor will submit a diagnosis and recommendations based upon study guide responses, performance on Progress Checks, and quarter diagnostics. Possible recommendations include continuation of sequence, repetition of specific segments, further use of other program texts, additional tutorials, and dropping out.

Flow Chart

SELF-PACED PHYSICS COURSE (Page 1 of three pages)



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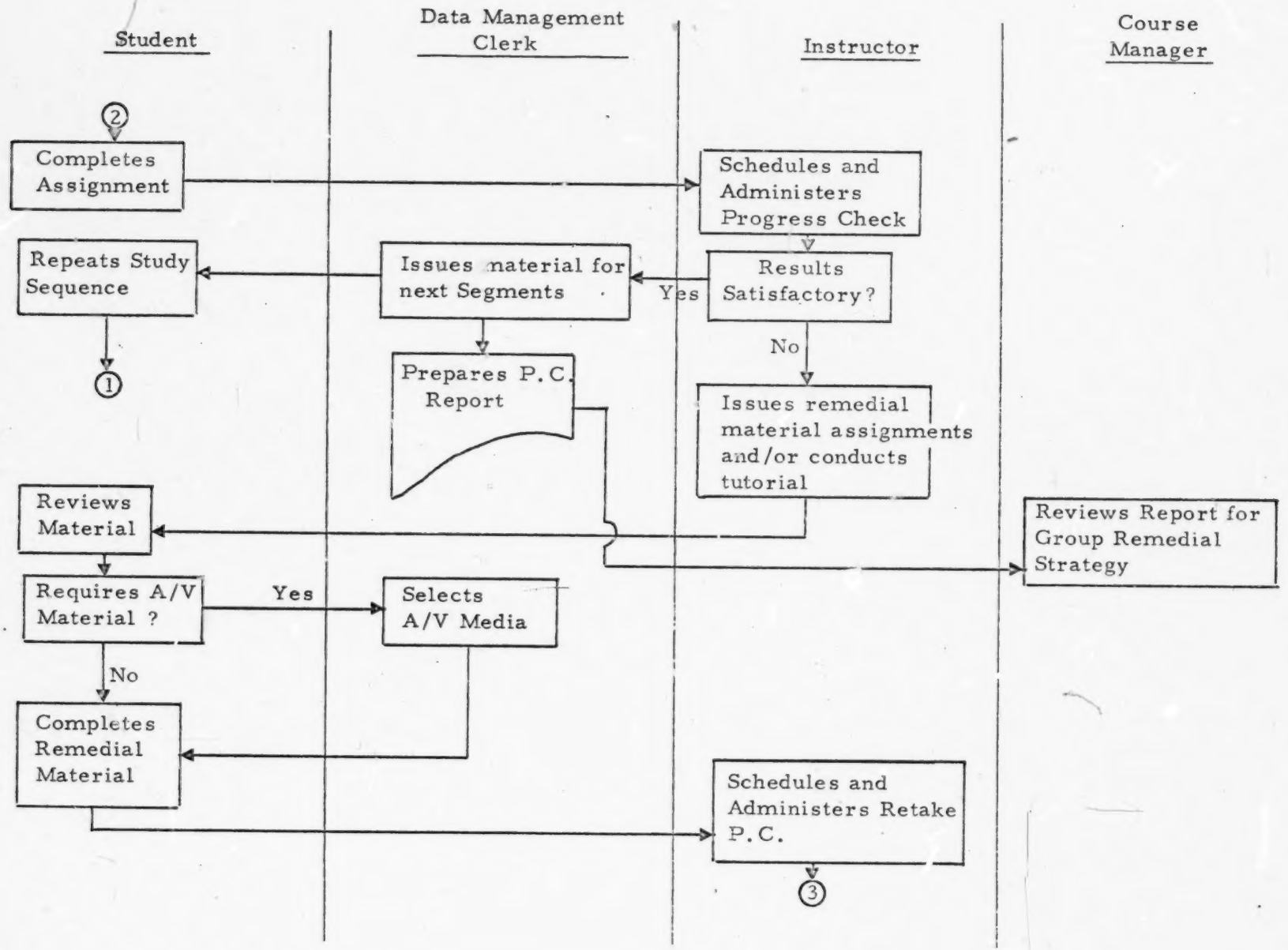

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